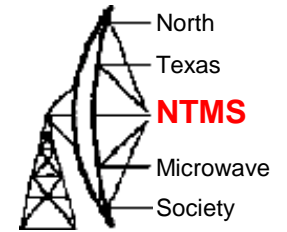


Introduction to Microwaves & The North Texas Microwave Society by Al Ward W5LUA Bob Gormley WA5YWC

presented at
HAMCOM
June 10th, 2011

Schedule



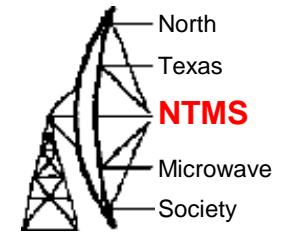
**1:00 PM Introduction to Microwaves and the NTMS
by Al Ward W5LUA and Bob Gormley WA5YWC**

**1:30 PM Building equipment and operating on 10 GHz by
Bob Gormley WA5YWC and Al Webb W5RLG**

**2:15 PM Microwave EME from 902 MHz to 78 GHz by
Al Ward W5LUA**

2:45 PM Wrap up & Q&A

The North Texas Microwave Society was formed in 1986



Our Goal:

**Dedicated to Promoting Activity, the
State of the Art in Equipment Design,
and
the Exchange of Ideas and Technology
for the Amateur Bands Above 902 MHz**

President – Al Ward, W5LUA

Vice President – Bob Gormley, WA5YWC

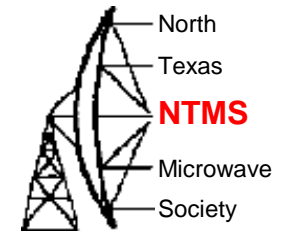
Secretary – Eric Haskell, KC4YOE

Treasurer - Wes Atchison, WA5TKU

Feedpoint Editor - Chuck Clark, AF8Z

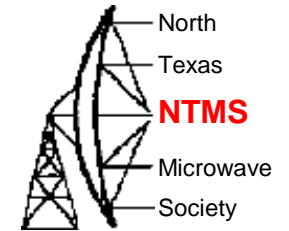
Web Master - Joe Jurecka, N5PYK

Why Microwaves?



- Operations can be challenging, fun, and very rewarding. While NTMS focuses on promoting microwave, our members heavily use weak signal communications on the 50, 144, 222, and 432 MHz bands. There is much life outside of FM repeaters on VHF, UHF, and up.

Band Allocations



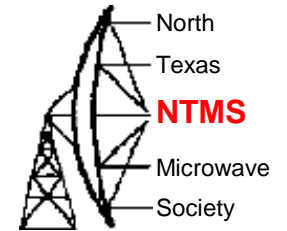
- 902-928 MHz
- 1240-1300 MHz
- 2300-2310 MHz
- 2390-2450 MHz
- 3300-3500 MHz
- 5650-5925 MHz
- 10.0-10.5 GHz
- 24.0-24.25 GHz
- 47.0-47.2 GHz
- 75.5-76.0, 77.0-81.0 GHz
- 119.98-120.02 GHz
- 142-149 GHz
- 241-250 GHz
- All above 300 GHz

22,121 MHz of Spectrum!

In contrast, the entire HF band covers 30 MHz (Ham allocation: 3.75 MHz)

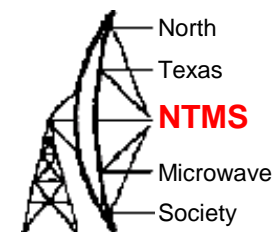
The VHF/UHF allocations cover 41 MHz

NTMS

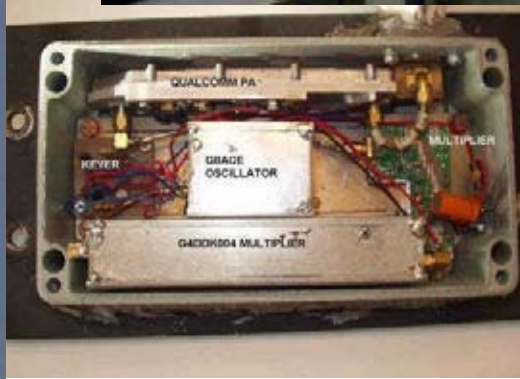
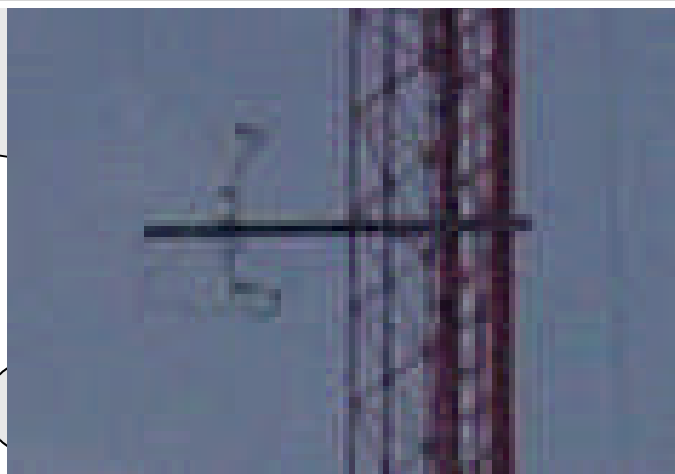
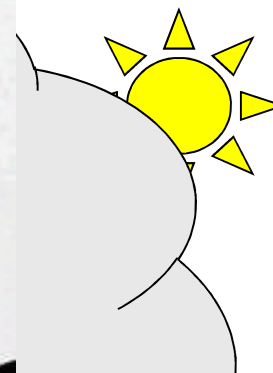


- Dues \$12.00 per year
- Meetings or activity once a month
- NTMS has a member's email reflector used primarily for technical discussion and propagation announcements
- NTMS web page www.ntms.org
- NTMS sponsors numerous North Texas beacons used for propagation studies and equipment check-out
- Feedpoint is the official NTMS newsletter
- Sunday Night NET at 8PM on 144.260 MHz run by K5ZSJ and N5PGH

NTMS Propagation Beacons

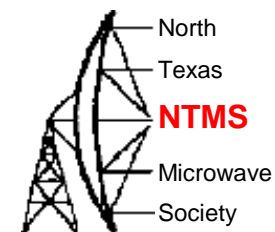


Frequency (MHz)	Call	Grid	Power Output	Antenna	Height Above Ground	Status
50.070	W5HN	EM13sj	0.5 W	Halo	180 ft	ON THE AIR
144.281	W5HN	EM13sj	1.5 W	Halo	180 ft	ON THE AIR
222.060	AA5C	EM13se	8 W	Folded Dipole	45 ft	ON THE AIR
432.380	W5HN	EM13kf	0.5 W	Square Loop	280 ft	ON THE AIR
902.380	W5HN	EM13kf	+38 dBm	Alford Slot	280 ft	ON THE AIR
1296.380	W5HN	EM13kf	+33 dBm	Alford Slot	280 ft	ON THE AIR
2305.001	AA5C	EM13se	1 W	Alford Slot	48 ft	ON THE AIR
3456.325	W5HN	EM13kf	+13 dBm	Alford Slot	280 ft	ON THE AIR
5760.325	W5HN	EM13kf	+14 dBm	6 Slots in WR-137	280 ft	ON THE AIR
10368.238	W5HN	EM13kf	+14 dBm	8 Slots in WR-90	280 ft	ON THE AIR
10368.380	NT5NT	EM12px	1 W	200 Deg Horn - West	246 ft	ON THE AIR
24192.100	W5HN	EM13kf	0 dBm	18 dB Horn - East	280 ft	ON THE AIR
24192.380	N4FRE	EM13qd	1.1 W	18 dB Horn - South	30 ft	ON THE AIR
24192.400	AA5C	EM13se	+17 dBm	Alford Slot	48 ft	ON THE AIR
47088.100	N4FRE	EM13qd	+10dBm	33dBI lens	30 ft	ON REQUEST



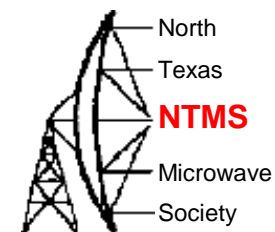
Expedition to Canadian, OK

WA5TKU & W5LUA at Arrowhead State Park

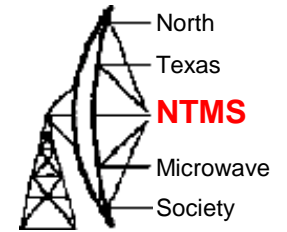


Microwaving in West Texas

K5WO & WA5YWC

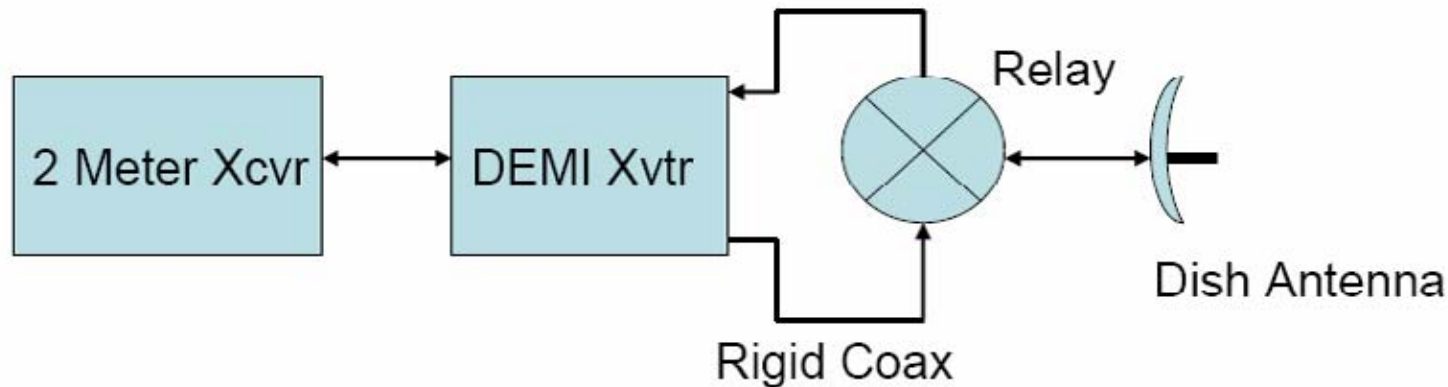
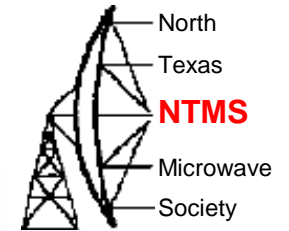


How to get on the microwave bands??



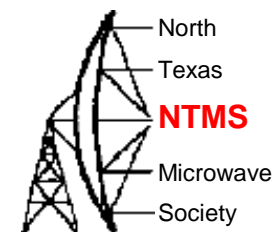
- Commercial transceivers typically top-out at 1296 MHz
- Transverters are used to cover other bands
- A transverter translates a lower frequency like 144 MHz or 2 Meters to a much higher frequency
- The transverter sets the power output and system noise figure
- Good feedline required – heliax and waveguide
- Good antennas are a must – loop yagis through 3456 MHz, parabolic dishes best for 5760 MHz and higher

Basic Components



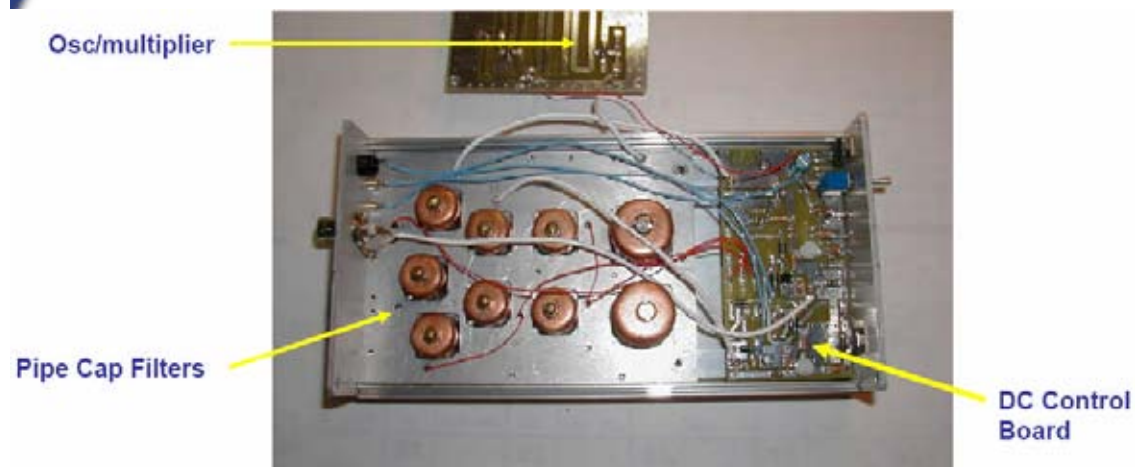
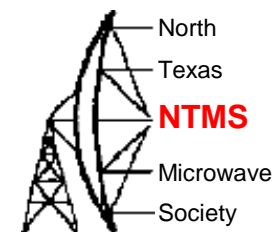
- 2 meter I/F transceiver
- Down East Microwave 10 GHz Transverter Kit
- Relay and rigid coax
- Dish or Horn antenna

2 Meter Multimode I/F Radio



- FT-817
- FT-857
- IC-202
- FT-290
- IC-251
- TS-700A

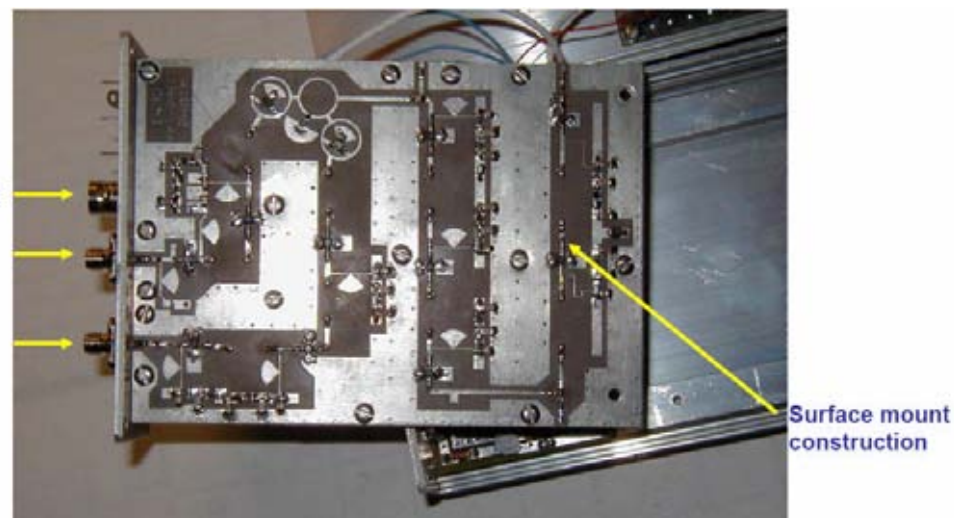
DEMI Transverter Kit



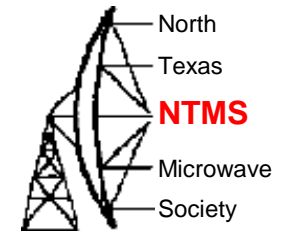
144 MHz in/out

10 GHz in

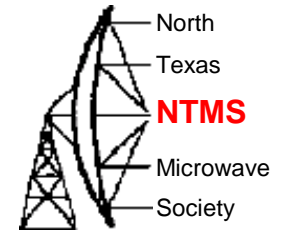
10 GHz out
(10 mW)



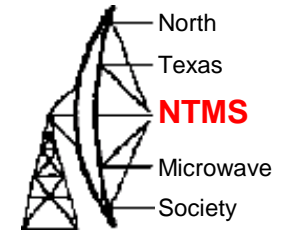
Antenna Measuring Party At the WA5VJB QTH in May



10 GHz Tune-up Party at the WA5YWC QTH in April

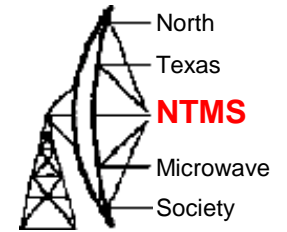


How Far on milliWatts?

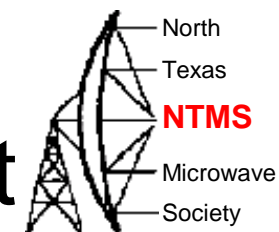


- 50 MHz - N6CA has worked several thousand miles on 10 mW
- 144 MHz - W5LUA has worked over 200 miles on SSB with 100 mW
- 3456 MHz - WA5VJB has worked 170 miles with 10 mW
- 10368 MHz - W5HN has worked 30 miles with 100 μ W
- 24192 MHz - W5LUA and AA5C have worked at 6 miles with 30 μ W

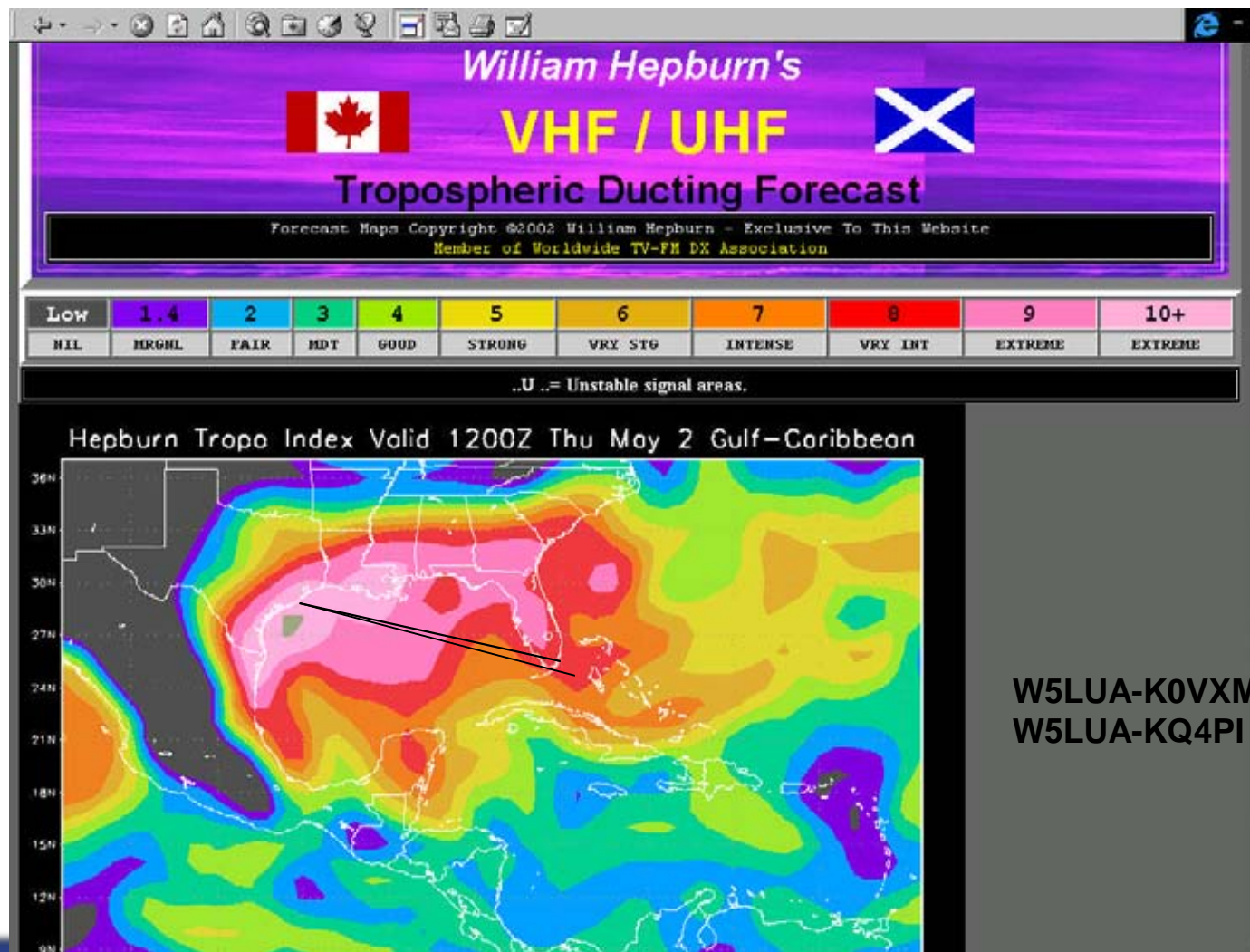
Microwave Activities



- Propagation/Band Openings
- Rain / Snow Scatter
- Grid Square Chasing (VUCC)
- Contesting (fixed/mobile)
- EME (Earth-Moon-Earth)
- High Speed Multi-media (HSMM)
- Digital modes/WSJT
- Homebrewing
- Conferences



Hepburn's Propagation Forecast

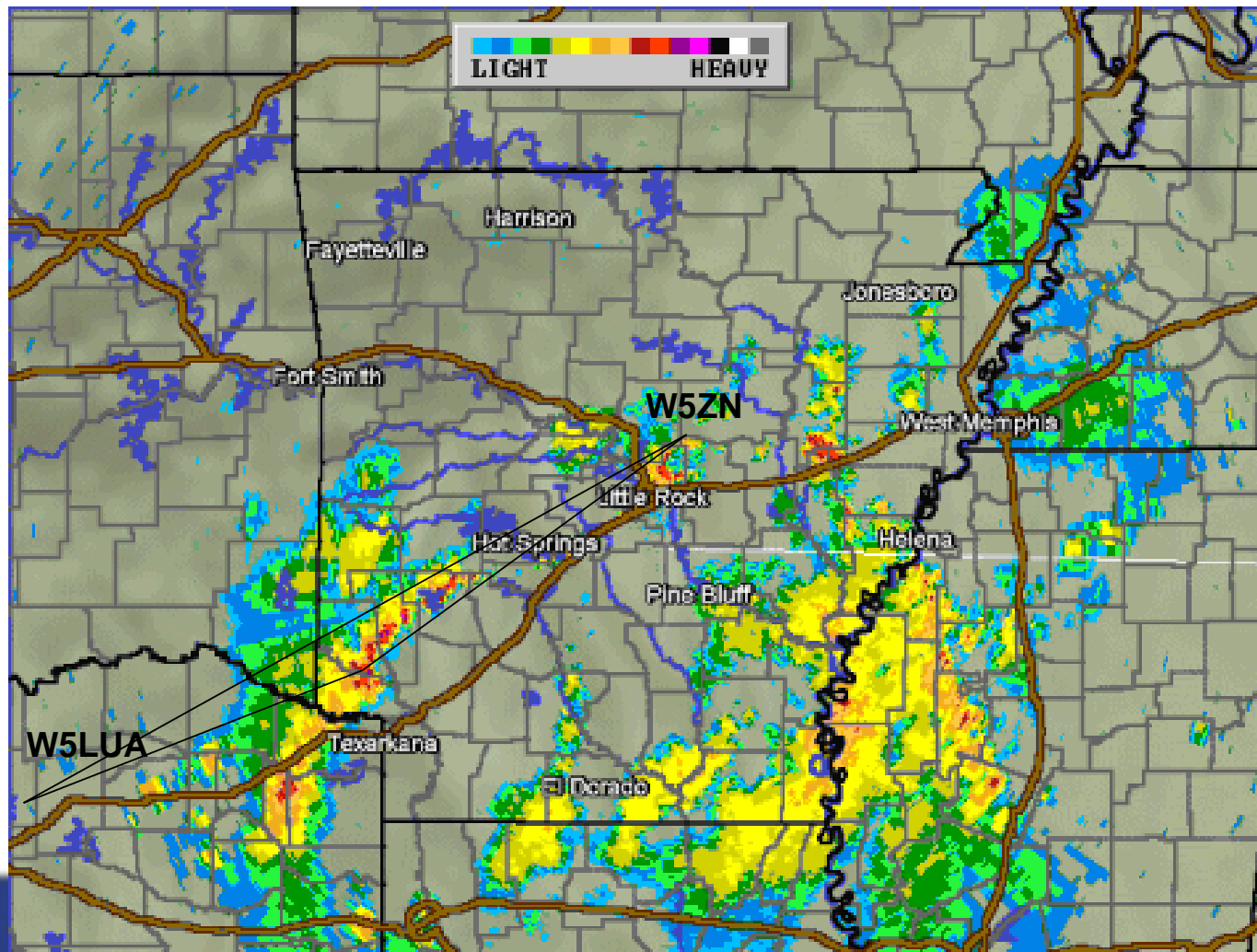
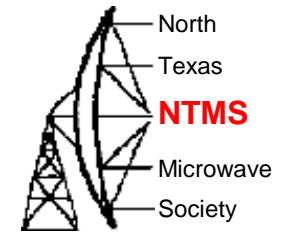


Link on
www.ntms.org

W5LUA-K0VXM 2304MHz 1000MILES
 W5LUA-KQ4PI 3456MHz 936 MILES

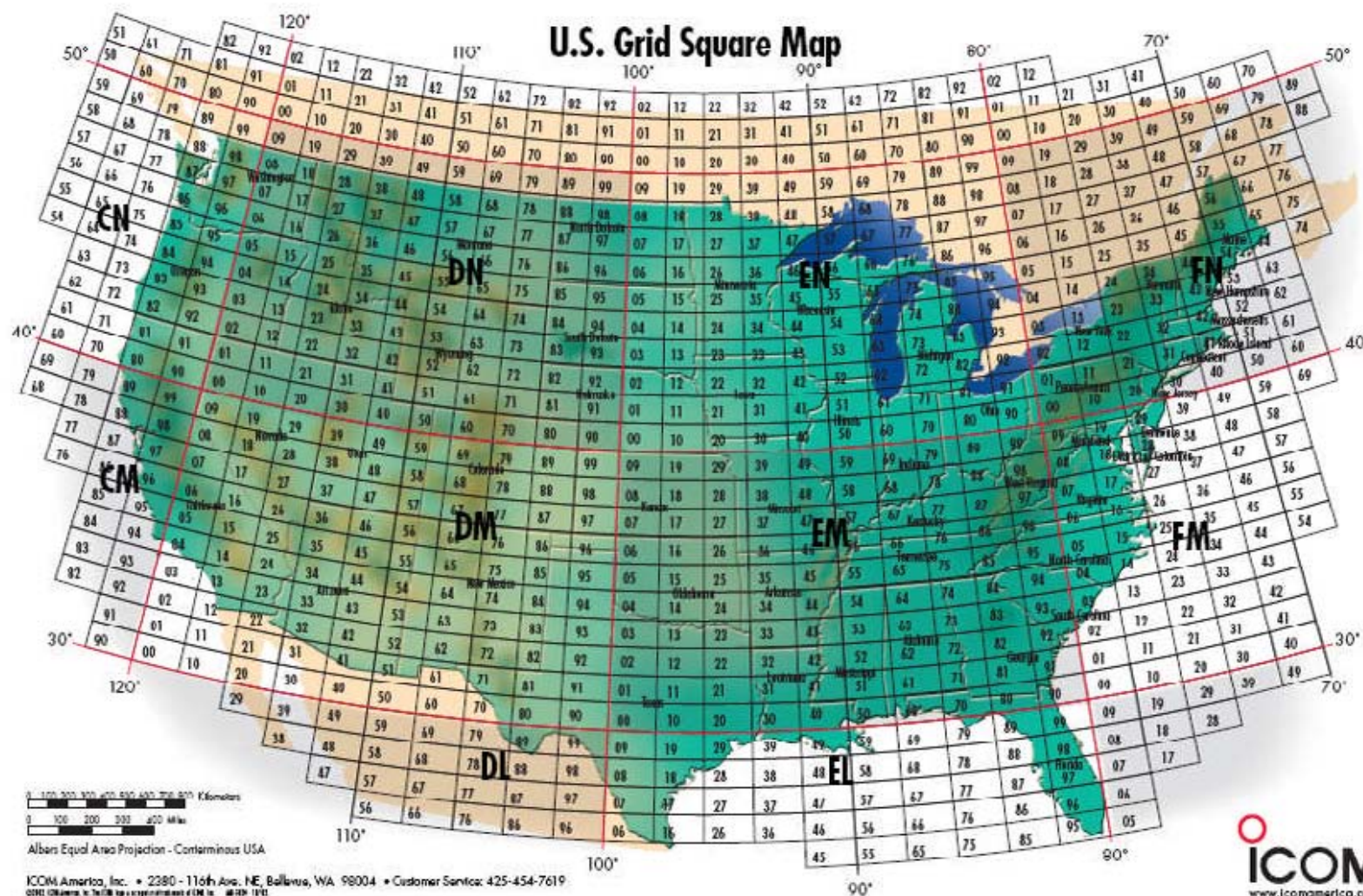
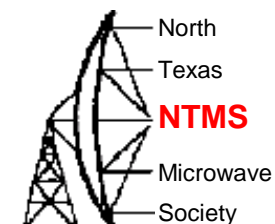
W5HN

KATV CH 7 Weather Radar

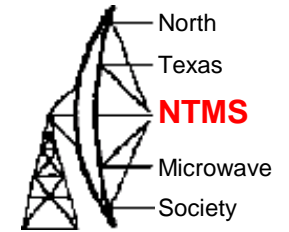


2 Way CW
Rainscatter
QS0
June 17, 2000
2145 GMT
10368 MHz
W5LUA-W5ZN
EM13QC-
EM45DH
320 miles /
515km

Grid Squares



VUCC is like DXCC

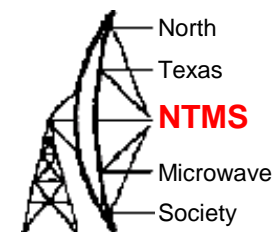


Bands

Grids req'd for VUCC

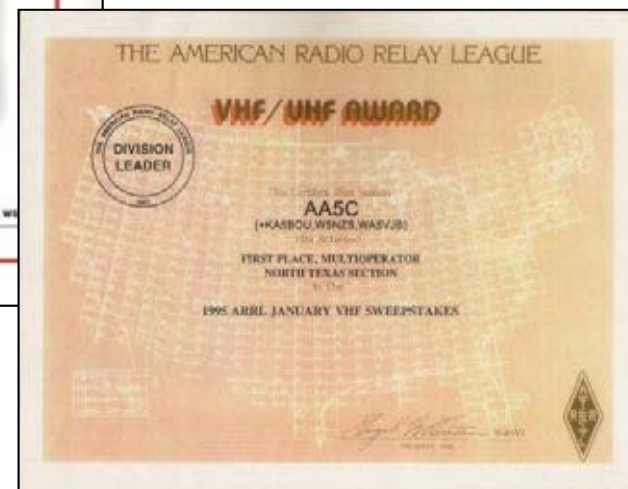
- | | |
|----------------------------|-----|
| • 50 MHz, 144 MHz | 100 |
| • 222 MHz, 432 MHz | 50 |
| • 902 MHz, 1296 MHz | 25 |
| • 2304 MHz, 3456 MHz | 10 |
| • 5760 MHz, 10 GHz, 24 GHz | 5 |

Contests

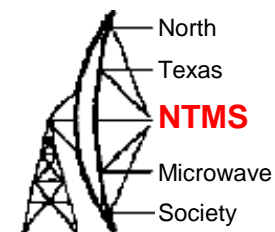


- Major Contests in

- January
- June
- August
- September



Roving during Contests

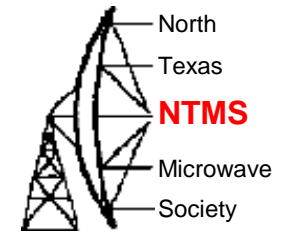


K5GJ & N5AC



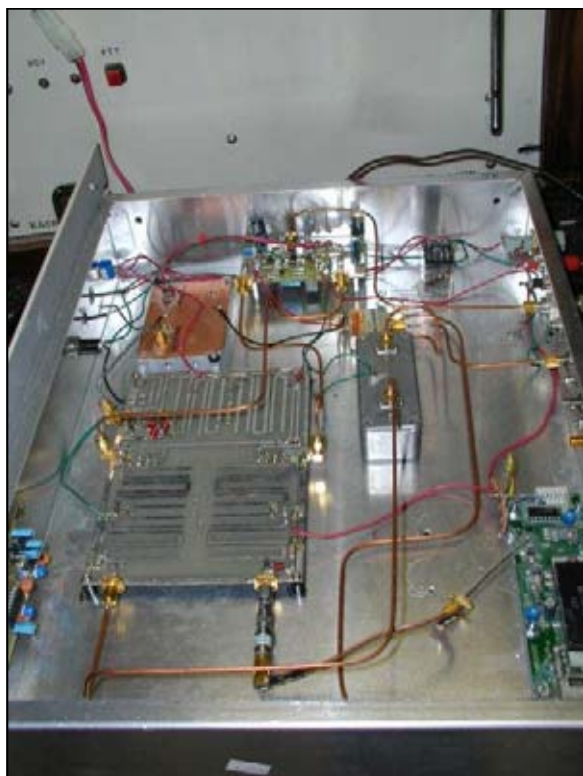
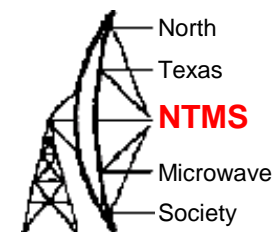
W5LUA & WA8RJF

Homebrewing

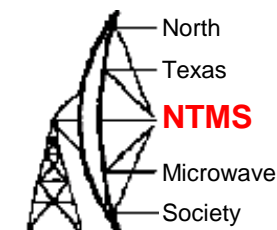


- Transverters
- Amplifiers
- Controllers
- Antennas
- Mounts
- Etc.....

902 Transverter



2304 MHz Amplifiers



TEXAS
TARRANT COUNTY
COUNTY CLERK

KM5PO

JIM McMASTERS
2805 Shady Lane South
Arlington, TX 76001 U.S.A.
Email: jim_mcmasters@tandybrands.com



KM5PO
Confirming QSO with **KASBON**

DATE MONTH YEAR	TIME	FREQ	MODE
03-09-07	0815	5.94436	SSB

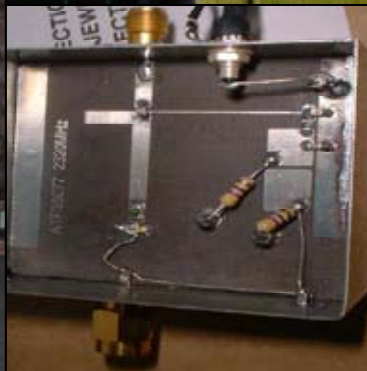
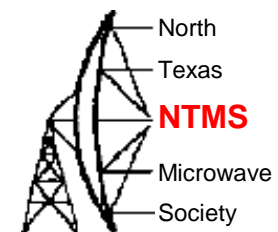
My name is **Inp Craig**
 My call sign is **2304 QSO**

TS-2000
DEMI 2304 Transverter
Spectrum Rap 50W
110' of 196' Heliwave
20' of 16" Helix loop
D.S. 76 element loggy
at 35' AGL

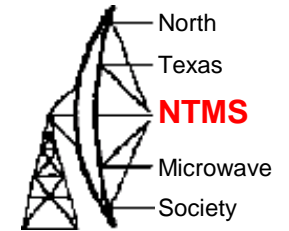
03-09-07 0815
 5.94436 SSB
 Inp Craig 2304 QSO



More Homebrewin'



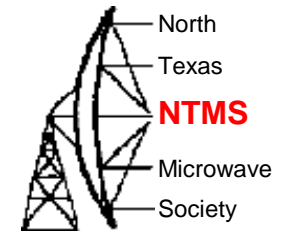
Central States VHF Society Conference



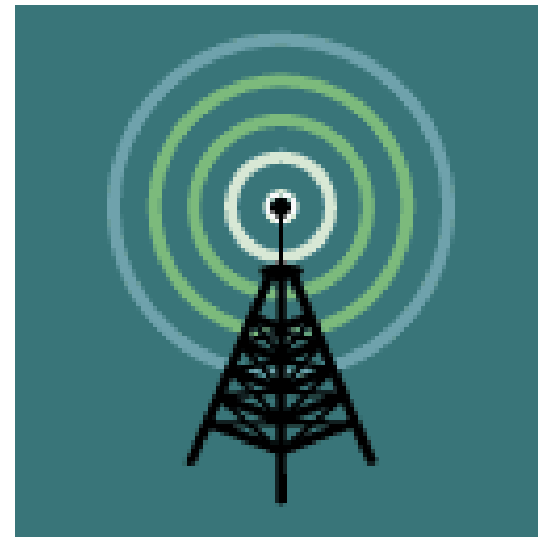
- Premier National Conference for VHF and UHF Amateur Radio Enthusiasts
- Annual Conference running since 1974
- The North Texas Microwave Society will sponsor the 2011 CSVHF Society conference in Irving, Texas July 29th and 30th.
- Contact Chuck Clark AF8Z (cclark4379@earthlink.net) for details
- Check www.csvhfs.org and www.ntms.org for conference schedule and updates



Microwave Update Conference

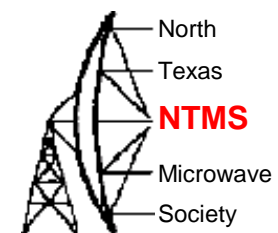


- Premier National Conference for Amateur Microwave Enthusiasts
- Worldwide Attendance
- The NTMS Sponsored MUD in October 2009
- The San Bernardino Microwave Society Sponsored MUD in 2010
- The North East Weak Signal (NEWS) group will sponsor MUD 2011 in Enfield, Connecticut – contact Bruce N2LIV at n2liv@optonline.net
- Check www.ntms.org and www.microwaveupdate.org for updates

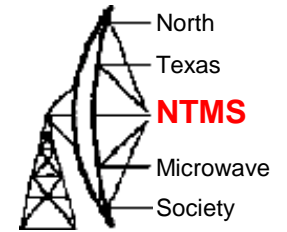


W5HN

Questions?



Schedule



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